

Automated Fluid Interface System

Tony Tyler/EP43
205-544-2135
E-mail: tony.tyler@msfc.nasa.gov

Nick Johnston/EB44
205-544-2055
E-mail: nick.johnston@msfc.nasa.gov

The automated fluid interface system (AFIS) is an advanced development program aimed at providing a standard

interface for on-orbit consumable transfer. The AFIS is capable of transferring propellants, fluids, gases, power and cryogenics from a tanker craft to other spacecraft. This technology could be utilized for any on-orbit systems requiring resupply, including the *International Space Station*, satellites, and spacecraft. This technology could greatly increase the life and flexibility of future satellites.

An engineering unit has been designed and built as a joint venture with MOOG, Inc. This design is lightweight, reliable and flexible. This can be attributed to an innovative design in which all required

operations are accomplished by one actuator. This actuator rotates protective covers, locks the two spacecraft sides together, and engages couplings for transfer of consumables. The actuator accomplishes this by providing two motions. The actuator extends a shaft linearly out and then at the end of stroke, rotates 45 degrees and linearly retracts again.

The engineering unit is currently undergoing testing at MSFC. The purpose of the testing is to determine the acceptability of the design and determine additional improvements required. This testing consists of functional, load, simulated docking and engagement, thermal vacuum, and vibration. Most of the testing is complete. The design has been proven to satisfy requirements well. However, some improvements and changes have been determined and will be implemented in the next generation design.

This program has laid the groundwork for a flight qualified system which can be easily adapted by future users requiring on-orbit consumable resupply. The future for this program is to build, qualify, and fly a flight experiment based on this technology.

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Biographical Sketch: Tony Tyler has worked in mechanism design since May 1989 in the MSFC Propulsion Lab.

Nick Johnston has worked as an electrical engineer in the robotics group since 1989 in the MSFC Astrionics Laboratory. ■

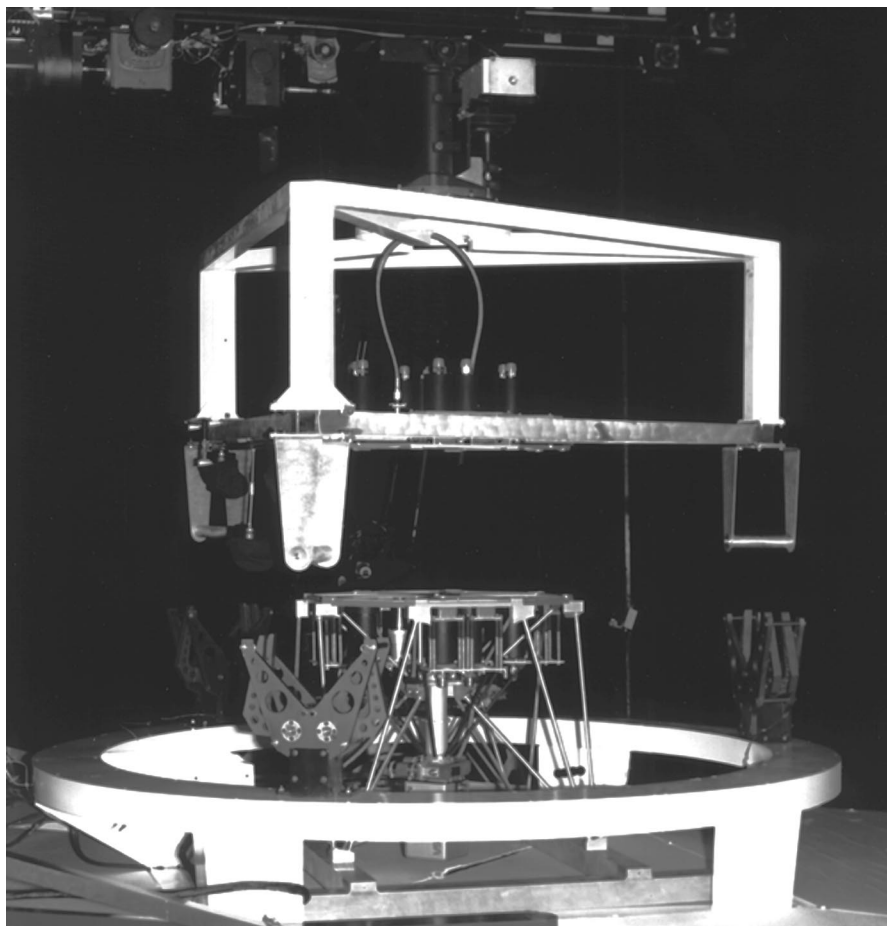


FIGURE 43.—Automated fluid interface system/three-point docking mechanism (AFIS/TPDM). Flat floor test autodocking of AFIS/TPDM before capture.